DOCUMENT RESUME

ED 257 683 SE 045 780

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TITLE The Development of an Instrument for Evaluating the Effects of an Environmental Education Program on Young Children's Environmental Attitudes: A Pilot Study.
PUB DATE Jun 85
NOTE 86p.; Several pages of this document may not reproduce well due to marginal legibility. Master's Thesis, Stanford University.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160) -- Dissertations/Theses - Master Theses (042)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Attitude Change; *Attitude Measures; Diagrams; *Environmental Education; Pilot Projects; Primary Education; Program Evaluation; *Student Attitudes; *Test Construction
IDENTIFIERS *Environmental Attitudes; Environmental Education Research

ABSTRACT

An instrument was developed for use in evaluating the effects of environmental education (EE) programs on young children's attitudes. The instrument consists of pairs of drawings; students tell which picture in a given pair they like better. In developing the instrument, assumptions were made that second- and third-grade students have environmental attitudes and that EE programs have a potential to influence these attitudes. The instrument was administered to 232 students (294 students originally participating in the study) using a pretest/posttest design. These students were visiting Hidden Villa Ranch, an EE center in Los Altos Hills, California. (Directions and answer forms were translated into Spanish for classes with a substantial Spanish-speaking population.) Results show that: (1) the instrument can be administered to a large group of children quickly, easily, and without trained personnel; (2) the instrument has potential for evaluating changes in young children's environmental attitudes; (3) the instrument can be standardized for use by many EE programs or be customized to assess specific attitudes; and (4) age, sex, and prior EE instruction (either in a school or at a center) apparently do not adversely bias students' test performance. Supporting documentation (including sample pairs of drawings) is provided in appendices. (JN)

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THE DEVELOPMENT OF AN INSTRUMENT FOR EVALUATING THE EFFECTS OF AN ENVIRONMENTAL EDUCATION PROGRAM ON YOUNG CHILDREN'S ENVIRONMENTAL ATTITUDES: A PILOT STUDY

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Spring Quarter 1985

SE 045 780

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ACKNOWLEDGEMENTS

My deepest gratitude goes to Professor William J. Paisley for his invaluable suggestions. It has been my good fortune to have had his guidance and encouragement.

My thanks go to Jeffery Knowlton and Sheizaf Rafaeli for their assistance in the use of the SPSS$_x$ computer package; to Tracy Reith, Hae Yuon Kim and Jennifer Ann Lee for the contribution of their artistic talents; to Gloria Ruiz, Chris Boas and Wade Gray for their translations into Spanish of instrument instructions; to Mary Hallesy, Lynne Steitzel, Mike Miller and Christy Holloway of Hidden Villa for their enthusiasm and ideas; and to the students, teachers and administrators who agreed to participate in this study.

I also thank Residential Education's Row Office for the use of their mimeographing equipment.

Lastly, I am indebted to Jennifer Ann Lee for her caring support throughout the course of the project.

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The Development of an Instrument for
Evaluating the Effects of Environmental Education Programs
on Young Children's Environmental Attitudes: A Pilot Study

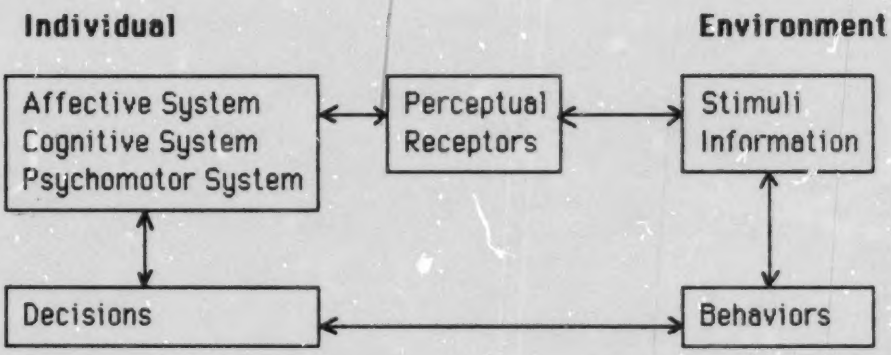
Program evaluation has been widely recognized as the area which has the greatest research need in environmental education. Kostka (1977) reported that nature center staffs "have no way of knowing if their programs and facilities cause any real impact on the visitors' environmental attitudes."[1] Roth (1980) added, "[e]nvironmental education research efforts that relate to the empirical documentation of program effectiveness, demonstrates goal attainment, concept acquisition, belief and attitude shift, and skill acquisitions are urgently needed."[2]

In particular, little research has focused on the environmental attitudes of young children.[3] Lucko, et al (1982) underscored this shortcoming -- their survey of 284 elementary and secondary programs found that 49.6% reported no evaluation, 43.0% informal evaluation at best, and only 7.4% formal evaluation.[4]

As a naturalist-intern in Yosemite National Park during the summer of 1984, I recognized this lack of evaluation firsthand. Children between eight and ten years of age who visited the Park had the opportunity to participate in the Junior Ranger Program. The goal of this program was for children "to enjoy, learn about, and appreciate their natural surroundings in the park and **apply their awareness to areas elsewhere**... While having fun, children will hopefully be stimulated to question and **further investigate their natural environment.**"[5] (*emphasis added*) Apparently, the program was successful, at least when measured in terms of longevity -- children have become Junior Rangers every summer since the 1930's. However, did the program meet its stated objectives? Did children retain the acquired awareness gained through the program once they returned home? There is presently no formal evaluation which investigates whether the Junior Ranger Program has lasting effects.

Beyond the simple reason that there is a lack of research, it is important to evaluate young children's environmental programs in order to fulfill more effectively the primary goal of environmental education, which is to develop a population that is (1) knowledgeable about the biophysical and sociocultural environments of which man is a part, (2) aware of environmental problems and management alternatives of use in solving these problems, and (3) motivated to act responsibly in developing diverse environments that are optimal for quality life."[6] Variables which affect environmental awareness -- beliefs, attitudes, behaviors, values and knowledge -- are all influenced at an early

age. LaHart and Barnes (1979)[7] outlined a conceptual model which explains the interaction of these variables:



Environmental information is selectively screened by perceptual receptors. It then influences the individual cognitively and affectively. Conversely, the individual's attitude and knowledge can affect perception. Individuals who possess a positive environmental attitude view themselves "as a part of the natural world; [they] feel a personal responsibility for environmental problems and an awareness of the ramifications of choices in environmental decision-making."[8] The individual's processing of the information therefore ultimately affects decision-making and hence environmental behaviors. These actions allow additional environmental information to be received. Consequently, it is important to evaluate how environmental education programs affect young children -- these initial effects will influence their future environmental perceptions and awareness.

Jaus (1982) demonstrated in a group of fifth graders that those who received instruction in environmental education possessed significantly more positive attitudes toward the environment than those who did not receive information.[9] And what happens in younger children? Mitchell and Lunneborg (1973) investigated the effects of environmental education on first graders' values, skills and knowledge.[10] A posttest only design was used and assessment was done individually and in small groups through interviews or specially-designed tests. Their results indicated that environmental education affected values and skills positively but not knowledge.

Objectives

It was my aim to design an instrument which can be used to evaluate the effects of environmental education programs on young children's attitudes in particular. I decided to focus on attitudes primarily because of the

aforementioned importance of attitudes in shaping young children's perceptions of the world, and also because there already exists environmental knowledge scales for this age group.[11]

I wanted to develop an instrument which can be administered quickly, easily, and without trained personnel, but which would still give an indication of program effectiveness; in other words, a "quick and dirty" measure of attitude change. In addition, I wanted this instrument to be standardized in order for it to be used on large groups, and on a variety of young children's environmental education programs. For this latter reason, Mitchell and Lunneborg's design would be unsuitable. Perusal of the literature showed that no other existing environmental attitude scale would be suitable for pre- and post-testing young children, specifically second and third graders, which would fulfill the objectives just stated. A new evaluation design would have to be developed.

Developing the Design

In developing this new design, two chief assumptions were made: (1) second and third graders have environmental attitudes, and (2) environmental education programs have a potential to influence these attitudes. Anecdotal[12] and research evidence support these assumptions.

In addition, two limitations had to be dealt with: (1) a short time frame (about three months) in which to complete the study, and (2) the subjects' undeveloped perceptual and cognitive capabilities.

The first limitation ruled out the possibility of using a longitudinal design for evaluating lasting effects. Moreover, a design which would measure immediate effects of the program on attitudes would better meet my objectives of developing a "quick and dirty" measure. A Solomon 4-group design would have been ideal but unfortunately, I did not have the luxury of being able to assign subjects to the necessary groups. My subjects were students who were already scheduled to visit Hidden Villa Ranch, an environmental education center in Los Altos Hills, California. I settled on a pre-post design with pre-determined experimental groups and assigned control groups (more on this later).

The second limitation was more challenging to overcome. Mitchell and Lunneborg pointed out the main difficulty when they reported, "[s]ince the children were young and not expert readers, it was decided that the conventional paper and pencil tests used with older children and adults would be unsuitable."[13] An instrument which did not require reading was necessary.

The use of drawings came to mind as the most feasible approach. Rejeski (1982) had used drawings successfully to investigate the relationship between

children's cognitive development and their perception of the environment.[14] However, his instrument required content analysis of the students' drawings -- a process which demands expertise and therefore would be not meet the objectives of this study.

An alternative to having children draw pictures is having them interpret pictures. One approach considered was showing a picture to a large group of children and asking them to identify what was happening in the picture. Given the children's limited writing abilities however, this would have required interviewing the children in small groups or individually -- again, unsuitable for this study.

Another approach would have been presenting the children with drawings which contained environmentally undesirable features and asking the children to circle features which they felt were "bad" or did not "belong". This would have required rather complex drawings with a number of items for the subjects to preceive correctly, making this as much a test of perception as of attitude.

The approach which ultimately gave rise to the instrument used in this study was one which tested concept utilization.[15] Fifty plates were shown to children. Each plate had drawings of a pair of objects. The children were asked, "How are these objects alike?" or "How do these objects go together?", in order to test their utilization of the concepts of color, shape, homogeneous function, relational function, object qualities, etc.

This approach was modified to test for environmental attitudes. Each plate would contain a pair of drawings. The drawings would be similar but would have one significant difference, contrasting an environmentally benign event or object with an environmentally deleterious one. The children would be shown the plates and then asked to circle on a separate form the letter of the drawing they liked better, thereby providing an indication of the children's environmental attitudes. As part of a pre-post, experimental-control design, this instrument would give an indication of an environmental education program's effects on the children's environmental attitudes. It would be quick and easy to administer without trained personnel to a large number of students, and could be standardized in order to be used with different environmental education programs.

Developing the Instrument

In developing the instrument, the key question was what kind of drawings to use. This obviously depended on what attitudes were to be measured and then, which of those attitudes could be transposed into clear and simple drawings. Additionally, as Kostka suggested, the drawings should assess "a

wide range of environmental attitudes, not specifically limited to the subjects under discussion during selected programs. It was reasoned that an environmental attitude scale of broad scope could be used to test effects of many different kinds of nature center programs."[16]

With this latter point in mind, a general list of environmental attitudes was generated through perusal of the literature and discussion with environmental educators at Hidden Villa (see Appendix A). From this list, an attempt was made to identify specific attitude objects which could easily be expressed through drawings. It was found that some of the attitudes could not be expressed in this manner. For instance, illustrating a food web or the rain cycle to test appreciation of interconnectedness in nature was too complex a concept to capture in drawings which young children would understand. Of necessity, the concepts and the drawings had to be simple. What resulted was the formulation of pairs of events or things which would present to children a dichotomy of antithetical attitude objects. Nineteen such pairs were developed which covered a range of environmental attitudes (see Appendix B.1). These pairs were transposed into drawings by four artists. It was reasoned that as long as both drawings in a pair were drawn by the same artist, style changes between pairs would not adversely affect the subjects' perceptions of the drawings.

In retrospect, these pairs were found to fall into three general categories: pastoralism vs. urbanism; preservation of nature vs. abuse of nature; and appreciation of natural objects vs. appreciation of human-made objects (see Appendix B.2). Although the array of drawings may have been simplistic and not inclusive of the whole range of environmental attitudes, it was felt that the drawings were representative of the kinds of attitudes which could be tested for in this age group, and were adequate for the purposes of this pilot study.

The drawings were checked for face validity by three experts in environmental education: Herb Dengler, instructor of the "Natural History of the San Francisco Bay Area" course at Stanford; Rachel Wing, teaching assistant for "Public Decision-making Regarding the Human Environment" course at Stanford; and Dana Price, former guide at Hidden Villa Ranch. They were unanimous in concurring on which drawing was the environmentally benign one in each and every pair.

The set of drawings was then tested for readability and appropriateness in a trial run. The subjects were four children from Menlo Park, California: a five year-old boy, an eight year-old boy, an eight year-old girl and a nine year-old girl. The children were asked to look at each pair of drawings and, on an answer form, circle the choice for the picture they liked better. No indication

was given as to the purpose of the test.

None of the children had any problems understanding the content of the drawings. The five year-old boy had difficulty keeping his place on his answer form with the corresponding pair of drawings. However he was younger than the second and third graders who were to be tested in the pilot study; since the other three children had no problems with the answer form, it was decided to keep the form as it was.

After the children completed the exercise, they were asked what their reasons were for picking their answers. In particular, it was necessary to determine if the children were picking their choices for the "correct" reason, and not because the picture looked better. The children who picked the "correct" picture stated valid reasons for doing so. In almost all cases, at least one child picked the "wrong" picture -- this indicated that the "correct" choice in most pairs was not obvious. One pair of pictures, however, was too obvious -- pair 5. The children exclaimed, "Simple!" upon seeing the choices and as one child explained, "No one likes to litter." This pair was eliminated from the instrument.

Pair 14 was touched up in response to a remark that one drawing looked better. In addition, other pairs were eliminated or combined since they had subjects similar to those in other pairs. Pairs 10 and 11 were combined, using the drawings of the bird in the birdhouse and the bird in the nest. In this new pair, the bird "would be free" and would still have a home in each drawing. Pair 6 was eliminated in favor of Pair 7 in order to test whether children felt comfortable being alone in either setting. Pair 12 was eliminated in favor of Pair 13 since the latter pair presented a stronger and clearer dichotomy -- living flowers vs. picked flowers.

As a consequence of these changes made after the trial run, fifteen pairs of drawings remained. Twelve of these pairs were randomly selected to be used in the pretest. The order of the pairs was randomized as was the position of the correct response in each pair.

For the posttest, the order of the twelve pairs was reversed to help decrease the chance of a learning effect. In addition, the remaining three pairs were added at the end as a possible measure of any learning effect.

As a further control, two sets of pretests were produced -- one merely being the reverse order of the other. The posttest for each set was the reverse of the corresponding pretest, with the three additional pairs appended.

It was determined from the trial run that color was not needed to improve the comprehensibility of the drawings. Also, it was decided that mimeographing yielded a product of adequate quality so as not to require

photocopying. The pairs of drawings were stapled together into a packet (see Appendix C).

Administering the Instrument

It was decided that for this pilot study, the Hidden Villa Ranch program would serve as the intervention (see Appendix D). Hidden Villa was selected because of my familiarity with its program, its proximity to Stanford, and its good reputation among educators. The intervention consisted of a two-and-a-half hour classroom visit by a Hidden Villa guide followed a week later by a full-day visit to the Ranch by the class. The classroom exercises included slide shows, puppet shows, singing and role-playing which conveyed to the children such concepts as: the history of Hidden Villa; its importance to the surrounding community; the value of animals and plants; and the sources of the food we eat. On the field trips, each class spent half a day on the trails and half a day on the farm. Through a number of activities, the children were taught to appreciate the value of cooperation and group unity as well as the value of being caretakers of the earth.

Seven classes from four schools were selected as the experimental group for this study. These classes were already scheduled to visit the Ranch. Fortunately, the schools were from different communities representing a range of socioeconomic conditions: two second grade classes from a middle-to-lower income community in East San Jose; two third grade classes from a similar neighborhood in Redwood City; two second grade classes from a middle-to-upper middle income neighborhood in Sunnyvale; and a second grade class in middle-to-upper income Palo Alto (see Appendix E).

It was hoped that control groups would come from the same schools as the experimental groups. However, classes from the same grade in a school typically go to Hidden Villa together. Control groups therefore were selected from schools in the same neighborhood, and presumably, similar socioeconomic conditions, as the schools from which the experimental groups came. The three control groups were from East San Jose, Redwood City and Palo Alto (see Appendix E).

Preliminary arrangements with each of the ten classes were made over the phone with teachers and administrators. Most teachers were happy to participate, especially since the study was being done in cooperation with Hidden Villa Ranch. Packets of pretests were delivered to the teachers, along with answer forms and instructions (see Appendix F). Administration of the tests was carried out by the teachers in the classroom with no intervention by myself, and the tests were designed to appear unrelated to any actual environmental education activity. Teachers were asked to read standardized directions aloud to their classes to ensure consistency. For classes with a

substantial Spanish-speaking population, directions and answer forms were translated into Spanish. As a guarantee against misinterpretation of the content of the pictures, short, "neutral" descriptions of the pictures were read to the children. Posttests were administered in the same manner (see Appendix G). Total testing time did not exceed thirty minutes for either the pretest or the posttest.

For the experimental group, the pretests were given one to three days before the Hidden Villa staff visit to the classroom, depending on the teacher's schedule. Posttests were given in class one to three days after the field trip to Hidden Villa Ranch. For the control groups, the tests were given ten to fourteen days apart, in the same time period as for the experimental group.

After the pretests were administered, the students were asked to take home and return a parent questionnaire (see Appendix H). Teachers were asked to complete a questionnaire as well (see Appendix I).

Results

294 students participated in the study. Sixty-two of these cases were invalid because these students took either the pretest or posttest only, or incorrectly marked their answer forms. Of the remaining 232 valid cases, 162 were in the experimental group and 70 were in the control group. Their test results, and information from the teacher and parent questionnaires were encoded and then analyzed using the $SPSS_x$ computer package on Stanford's LOTS facilities (see Appendix J).

Total change scores were computed in the experimental and control groups by taking the difference between the sum of correct answers for the twelve pretest questions and the sum of the correct answers for the corresponding twelve questions on the posttest. In the experimental group, 18% showed a negative change, i.e. scored lower on the posttest than on the pretest; 20% showed no change; and 62% showed a positive change. In the control group, on the other hand, 30% showed a negative change; 29% showed no change; and 41% showed a positive change.

Total Change	**Experimental**	**Control**
Negative	29 *(18%)*	21 *(30%)*
None	32 *(20%)*	20 *(29%)*
Positive	101 *(62%)*	29 *(41%)*
	162	70

A chi-squared test for independence was performed on a six-celled breakdown of total change scores, yielding a X^2 value of 11.57 with 5 degrees of freedom, and a probability value of less than 0.05. This result indicated that the gains made by the experimental group were significantly greater than the gains by the control group, and that there indeed was a substantial difference in attitudes because of participation in the Hidden Villa program.

Total Change	Experimental	Control
≤ -1	29 (18%)	21 (30%)
0	32 (20%)	20 (29%)
+1	33 (20%)	8 (11%)
+2	29 (18%)	10 (14%)
+3	17 (10%)	8 (11%)
≥ +4	22 (14%)	3 (4%)
	162	70

(see Appendix K for complete breakdown of data).

Could the apparent difference be due to other factors? To determine this, crosstabulations were computed, controlling for gender; age; previous visits to Hidden Villa; and additional environmental education in class which was independent of the Hidden Villa program.

Looking at gender, of the 82 males in the experimental group, 53 (65%) did better on the posttests than on the pretests. Of the 80 females, 48 (60%) did better. In the control group only 17 (38%) of 45 males and 12 (48%) of 25 females improved scores. For both males and females, the experimental groups tended to score higher on posttests than on pretests, whereas the controls did not, as expected, thereby indicating that test performance was apparently independent of gender.

MALE

Total Change	Experimental	Control
None or negative	29 (35%)	28 (62%)
Positive	53 (65%)	17 (38%)
	82	45

FEMALE

Total Change	Experimental	Control
None or negative	32 (40%)	13 (52%)
Positive	48 (60%)	12 (48%)
	80	25

As for age, 52 (32%) children in the experimental group were 7 years of age or younger; 67 (41%) were 8 years old, and 43 (27%) were 9 or older. In the control group, 25 (36%) children were 7 or younger, 28 (40%) were 8 years old, and 17 (24%) were 9 or older. In all three age categories, the experimental group tended to score higher on the posttest than on the pretest. As for the control group, one age category had higher scores on the posttest: 16 of the 25 in the 7 or younger group did better on the posttest. The other two age categories in the control group had lower posttest scores. Although there is no obvious explanation for the single unexpected outcome, in general, the data seem to support the expected outcome, thereby indicating that age is not a factor in test performance.

SEVEN YEAR-OLDS OR YOUNGER

Total Change	**Experimental**	**Control**
None or negative	21 *(40%)*	9 *(36%)*
Positive	31 *(60%)*	16 *(72%)*
	52	25

EIGHT YEAR-OLDS

Total Change	**Experimental**	**Control**
None or Negative	27 *(40%)*	17 *(61%)*
Positive	40 *(60%)*	11 *(39%)*
	67	28

NINE YEAR-OLDS OR OLDER

Total Change	**Experimental**	**Control**
None or Negative	13 *(30%)*	15 *(88%)*
Positive	30 *(70%)*	2 *(12%)*
	43	17

As for the factor of previous visits to Hidden Villa, in the groups which did not visit, the results were as expected. Of 120 in the experimental group, 71 (59%) improved while only 29 (41%) of the 70 in the control group improved on the posttests. Only 42 students had been to Hidden Villa previously, all in the experimental group. These students still had improved scores despite having been to Hidden Villa before -- 30 (71%) of the 42 children scored higher on the posttests. Indeed, their scores showed even more improvement after a second visit (but this result is based on a rather small sample). These findings indicate that the previous experience did not negatively affect the instrument's ability to detect attitude changes which were a result of their current visit.

NEVER VISITED HIDDEN VILLA BEFORE

Total Change	Experimental	Control
None or Negative	49 (41%)	41 (59%)
Positive	71 (59%)	29 (41%)
	120	70

VISITED HIDDEN VILLA BEFORE

Total Change	Experimental	Control
None or Negative	12 (29%)	-
Positive	30 (71%)	-
	42	-

Lastly, for groups which did not have environmental education in class other than the Hidden Villa program, the results were as expected. 42 (59%) of the 71 children in the experimental group had improved scores while only 11 (22%) of the 49 in the control group improved. For groups which did have some environmental education before the pretests, the experimental group still showed improvement. 59 (65%) of 91 children scored higher on the posttests. The control group also showed improvement: 18 (86%) of 21 students scored higher on posttests. The drastic improvement in the control group can not be accounted for, but the small number in the sample, and their being from the same class, may have skewed the outcome somewhat. Also, it seems that previous environmental education would have caused both pretest and posttest scores in the control group to be inflated. Therefore, the results are not conclusive; it is not clear what effect previous environmental education has on the students' test performances.

NO PREVIOUS ENVIRONMENTAL EDUCATION IN CLASS

Total Change	Experimental	Control
None or Negative	29 (41%)	38 (78%)
Positive	42 (59%)	11 (22%)
	71	49

PREVIOUS ENVIRONMENTAL EDUCATION IN CLASS

Total Change	Experimental	Control
None or Negative	32 (35%)	3 (14%)
Positive	59 (65%)	18 (86%)
	91	21

Individual questions were also examined to determine how students responded item-by-item. On pretests, the mean for the 271 valid cases was

8.05 (67%) correct out of 12. On posttests, the mean for the 244 valid cases was 10.89 (73%) correct out of 15. Pearson correlations were computed for each question on the pretest and posttest to determine the strength of the relationship between students' performance on individual questions and performance on the test overall. Since the correlations were computed without differentiating between experimental and control groups, percentage of correct responses was also considered in analysis.

Several items are of note. In pairs 1 and 12, the extremely high percentage of correct responses on the pretest in the experimental group may have limited the possibilities for improvement on the posttest. In pairs 3 and 4, the experimental group showed a small negative change in percentage correct. In the case of pair 4, the reason may have been, according to one of the teachers[17], because the children saw cars but no bicycles at Hidden Villa. In pair 8, the control group showed a greater gain in percentage correct than the experimental group. In the seven other pairs, the experimental groups outgained the control groups in percentage correct.

On the whole, the statistics show a substantial range of strengths in the questions' powers to indicate changes in the students' environmental attitudes. Evidently, some questions were better than others in their sensitivity as a measure of attitude change.

TEST ITEM	EXPERIMENTAL (% correct)	CONTROL (% correct)	PEARSON CORRELATION
Pretest 1	90%	66%	.30
Posttest 1	88%	81%	.36
Pretest 2	66%	72%	.42
Posttest 2	75%	57%	.51
Pretest 3	79%	75%	.40
Posttest 3	77%	77%	.42
Pretest 4	66%	71%	.33
Posttest 4	65%	73%	.22
Pretest 5	50%	57%	.33
Posttest 5	72%	45%	.37

Pretest 6	61%	67%	.39
Posttest 6	78%	78%	.36
Pretest 7	59%	59%	.47
Posttest 7	74%	68%	.41
Pretest 8	56%	52%	.40
Posttest 8	60%	60%	.37
Pretest 9	69%	75%	.33
Posttest 9	72%	68%	.33
Pretest 10	67%	67%	.47
Posttest 10	79%	75%	.44
Pretest 11	60%	56%	.43
Posttest 11	83%	69%	.40
Pretest 12	89%	66%	.34
Posttest 12	95%	68%	.36
Posttest 13	60%	48%	.56
Posttest 14	54%	44%	.45
Posttest 15	83%	88%	.36

The statistics show a similar unconformity for the extra questions on the posttests: pairs 13, 14 and 15. The expected response was little difference between the percent correct in the two groups -- it would be difficult to draw any conclusions from this data as to the presence of any learning effect. However, the chances of a learning effect are "somewhat diminished because the value-oriented nature of such a test should contribute to the difficulty of the respondent to perceive correct answers and anticipate the intent of the questions."[18] In addition, if there was a learning effect, the control group would have shown significantly higher scores on the posttests. Several of the individual items did show this but in terms of total change, the control group actually scored lower on the posttests than on the pretests. The results do not conclusively answer the question of whether there was a learning effect.

The data from the parents' questionnaires was not particularly useful since only 50 parents responded. 36 (72%) of the parents did note that there was a behavioral difference at home after their children's visit to Hidden Villa, especially in increased conversation about plants and animals, and in expressions of the desire to visit Hidden Villa again. This supports the opinion that environmental education programs have some impact on young children, albeit in this case, it is behavioral and not in attitude.

Teachers did not note, to the same degree, change of behavior in the classroom. Of the six teachers who responded, only two noted any difference, though it is probably difficult for teachers to assess differences in a large group. With respect to the administration of the instrument, several teachers mentioned that some students had difficulty keeping pictures with their corresponding places on the answer forms. They suggested that it would be easier for students to mark their answers directly in the packets.

Discussion

This pilot study tried out a newly developed instrument aimed at measuring changes in young children's environmental attitudes. Several comments can be made as a result of the trial. These comments apply only to the sample under investigation but give some direction for future applications of the instrument.

First, as is often the case in studies of this sort, the degree of control does not account for all threats of validity. Working within the constraints of practical reality meant that allowances had to be made for teachers' schedules; different styles of education among the Hidden Villa guides; weather; and other external factors which could not be easily controlled for. To the extent possible, steps were taken to ensure some consistency in the administration of the tests through a standard set of written instructions to the teachers. It is believed that the tests were administered in a fashion which yielded valid results for the purposes of this study.

It appears that this instrument can be administered to a large group of young children easily, quickly and without the assistance of trained personnel. In the future, permitting children to write directly in the packets would facilitate administration of the tests -- in this way, the instrument would more closely meet the goal of being appropriate for the verbal, writing and reading skills of this age group.

The data indicate that age, gender, and previous environmental education (either in the form of previous visits to Hidden Villa or previous classroom instruction) apparently do not adversely bias the students' test performance. Learning effect does not seem to have a significantly confounding effect, either.

The design of the instrument, however, needs refinement. The dichotomous nature of the test is problematic in that it allows only for "right" or "wrong" responses whereas values and attitudes often fall into "gray" zones. It is, however, the feature which allows for the ease of administration -- the beauty of this instrument is in its simplicity. It needs to be emphasized therefore that this instrument is really a qualititative tool which gives a general indication of program effects on young children's environmental attitudes. This instrument should be augmented and supported by using other methods in order to gain a more accurate measure of a program's influence on attitudes.

Another area needing refinement is in the selection of drawings. Several drawings were overly simplistic and resulted in a ceiling effect -- there was not much room for improvement after the pretest. More research needs to be done in developing pairs of drawings which are appropriate and sensitive tests of environmental attitudes, both in difficulty and in content. More generally, the interaction between young children's attitudes and prescribed attitude objects (in our case, drawings) needs to be better understood.

Conclusion

It has been shown that the use of drawings has some potential for evaluating changes in young children's environmental attitudes. The instrument developed in this study represents a simple yet effective way to assess a program's impact on environmental attitudes. It is quick and easy to administer, and does not require technical or expert assistance. Through prudent selection of drawings, it can be be a "quick and dirty" measure of a range of environmental attitudes. The instrument can be standardized so that it is useable by many environmental education programs yet, at the same time, it is adaptable, so that "customized" drawings can be added to assess specific attitudes. The instrument's utility can be extended through follow-up exercises after the posttests -- the drawings provide convenient starting points for class discussions on environmental values.

Refinement, repetition, and further refinement of the instrument will no doubt add to the strength of the test. It is my hope that this instrument offers a tool which will help environmental educators evaluate their programs, and subsequently, improve them.

Notes

[1] M.(Donna) Kostka, "Nature Center Program Impact," Journal of Environmental Education, 8(1), p. 52.

[2] Robert E. Roth, "Conceptual Development and Environmental Education," Journal of Environmental Education, 11(1), p. 8.

[3] Robert E. Horvat and Alan M. Voelker, "Using a Likert Scale to Measure 'Environmental Responsibility'," Journal of Environmental Education, 8(1), p. 37.

[4] Bernard J. Lucko, John F. Disinger and Robert E. Roth, "Evaluation of Environmental Programs at the Elementary and Secondary School Levels," Journal of Environmental Education, 13(4), p. 7.

[5] Junior/Senior Rangers ([Yosemite National Park]: n.p., n.d.), n.pag.

[6] Lucko, et al, p. 8.

[7] David E. LaHart and Lehman W. Barnes, "A Holistic Scheme for Environmental Education Research," Journal of Environmental Education, 10(2), p. 28.

[8] Kostka, p. 53.

[9] Harold H. Jaus, "The Effect of Environmental Education Instruction on Children's Attitudes Toward the Environment," Science Education, 66(5), pp. 689-692.

[10] Sandra K. Mitchell and Patricia W. Lunneborg, "Effects of Environmental Education on First Graders," Journal of Environmental Education, 4(4), pp. 34-37.

[11] Personal interview with Mary Hallesy (Hidden Villa), n.d.

[12] Hallesy.

[13] Mitchell and Lunneborg, p. 35.

[14] David W. Rejeski, "Children Look at Nature: Environmental Perception and Education," Journal of Environmental Education, 13(4), pp. 27-40.

[15] Telephone interview with Bill Hammerman (San Francisco State University), n.d.

[16] Kostka, p. 53.

[17] Note received from Ms. Sisney (A.J. Dorsa School), n.d.

[18] Dean B. Bennett, "Evaluating Environmental Education Programs," in Environmental Education: Strategies Toward a More Livable Future, ed. James A. Swan and William B. Stapp (New York: John Wiley and Sons, 1974) p. 132.

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Mitchell, Sandra K. and Patricia W. Lunneborg. "Effects of Environmental Education on First Graders." Journal of Environmental Education, 4, No. 4 (1973), 34-37.

Morfoot, Colleen and Brian F. Blake. "Evaluations of Environmental Interpretation." Journal of Environmental Education, 10, No. 1 (1978), 23-31.

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Rejeski, David W. "Children Look at Nature: Environmental Perception and Education." Journal of Environmental Education, 13, No. 4 (1982), 27-40.

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Yosemite National Park. Junior/senior Rangers. n.p., n.d., n. pag.

APPENDIX A
Selected Environmental Attitudes

Selected Environmental Attitudes

- Caretaking of the earth
- Appreciation of interconnectedness/whole systems
- Enjoyment of the natural environment in an intellectual and aesthetic fashion
- Environmental trust -- competence and security in natural environments
- Stimulus seeking -- affinity for adventurous environmental settings
- Desire to learn more about and become more involved in environmental matters
- Personal sense of responsibility about environmental matters
- Appreciation of natural objects over human-made objects
- Awareness of humans' role in ecological relationships
- Awareness of the importance of preserving the natural environment
- Concern about animals and plants
- Acceptance of balances as part of the natural code
- Awareness of consequences of use and abuse of nature
- Sense of wonder

APPENDIX B

Appendix B.1 - Pairs of attitude objects
Appendix B.2 - Categorization of pairs

Appendix B.1: Pairs of Attitude Objects

Pair Number	Plate A	Plate B
1	Street scene	Park scene
2	Cityscape	Mountainscape
3	Couple in a powerboat	Couple in a canoe
4	Family riding in a car	Family riding bicycles
5	Papers strewn around a wastebasket	Papers in the wastebasket
6	Three people walking down a street	Three people walking in the woods
7	One person walking down a street	One person walking in the woods
8	Boy caressing a lizard	Boy holding a lizard by the tail
9	Healthy lunch	Fast-food lunch
10	Bird on a birdhouse	Bird on a branch
11	Bird in a cage	Bird in a nest
12	Flowers growing in the ground	Flowers in a vase
13	Flowers growing in the ground	Flowers growing in a flowerpot
14	Children leaving trash	Children carrying away trash
15	Deer in a zoo	Deer in the wild
16	Boy looking at a web with a magnifying glass	Boy breaking web with a stick
17	Boy smelling a flower	Boy picking a flower
18	Girl hugging a tree	Girl chopping down a tree
19	Children watching birds on television	Children watching birds outdoors

Appendix B.2: Categorization of pairs

Category 1: Pastoralism vs. urbanism
Category 2: Preservation of nature vs. abuse of nature
Category 3: Appreciation of natural objects vs. appreciation of human-made objects

Pair number	Category 1	Category 2	Category 3
1	x		
2	x		
3		x	
4		x	
5		x	
6	x		
7	x		
8		x	
9			x
10			x
11			x
12			x
13			x
14		x	
15		x	x
16		x	
17		x	
18		x	
19			x

APPENDIX C
Sample packet of drawings (posttest form)

29

A

B

30

A

31

B

32

A

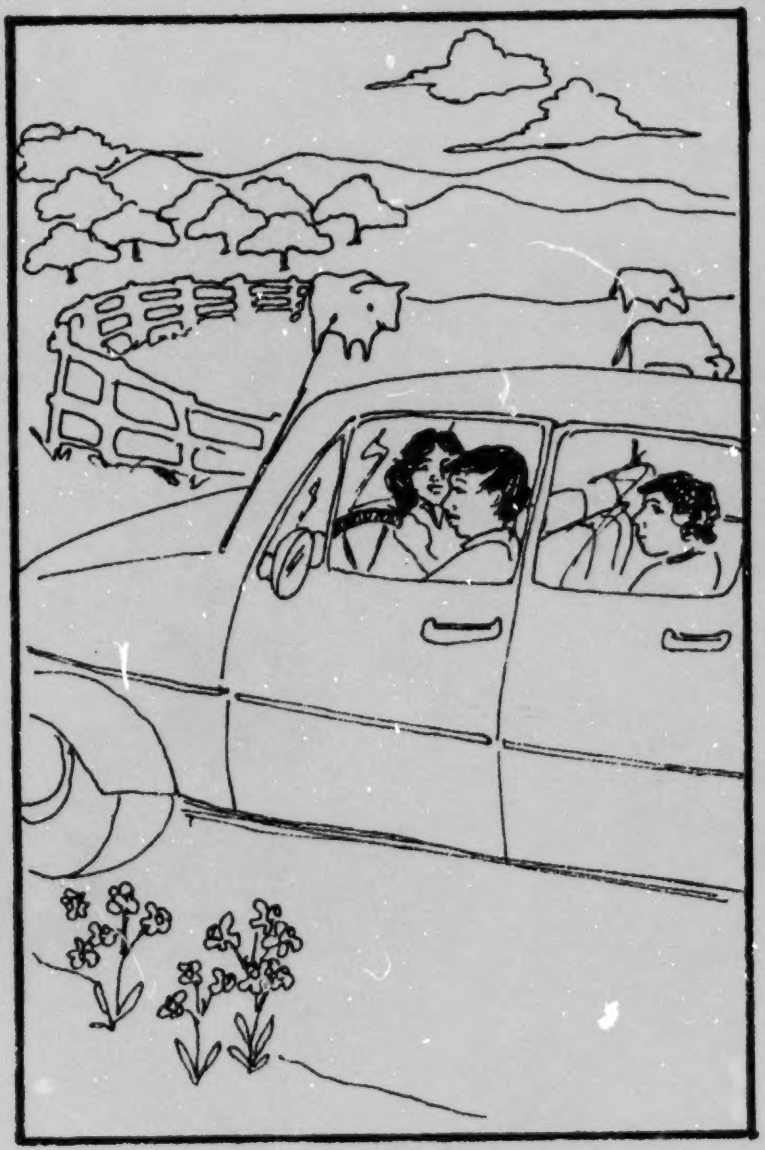
33

B

34

A

35



B

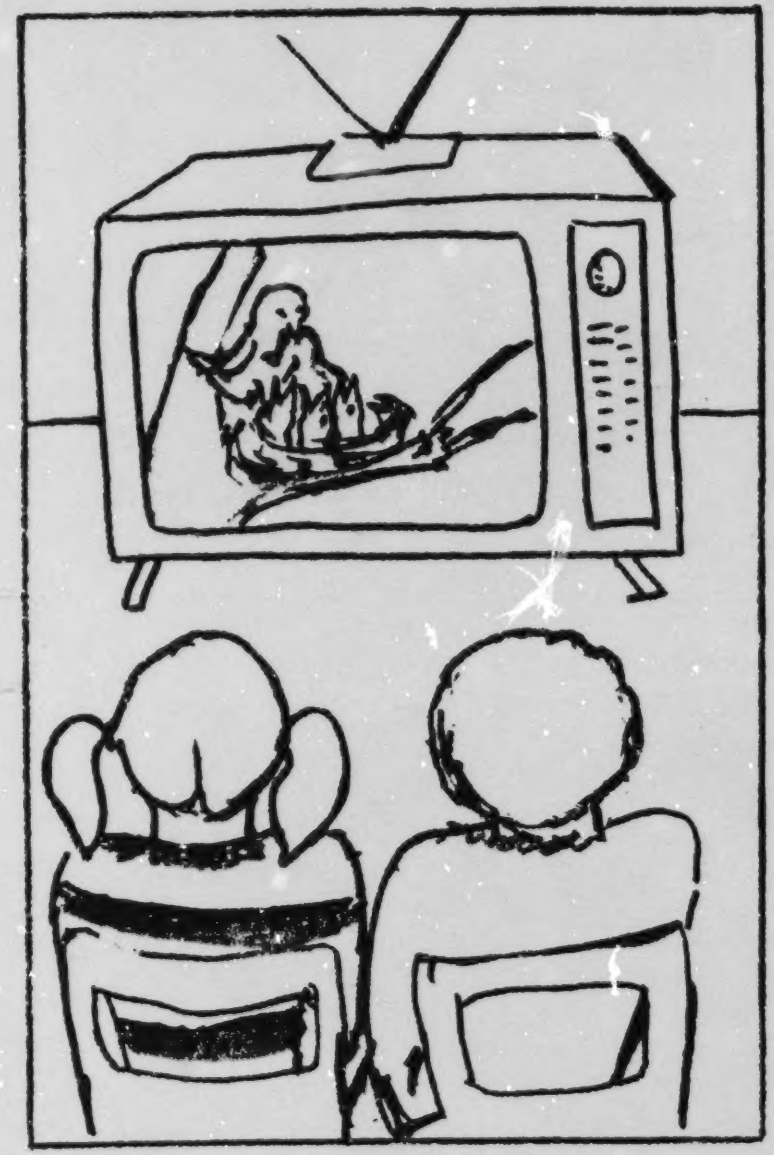
36

A

37

B

38



A

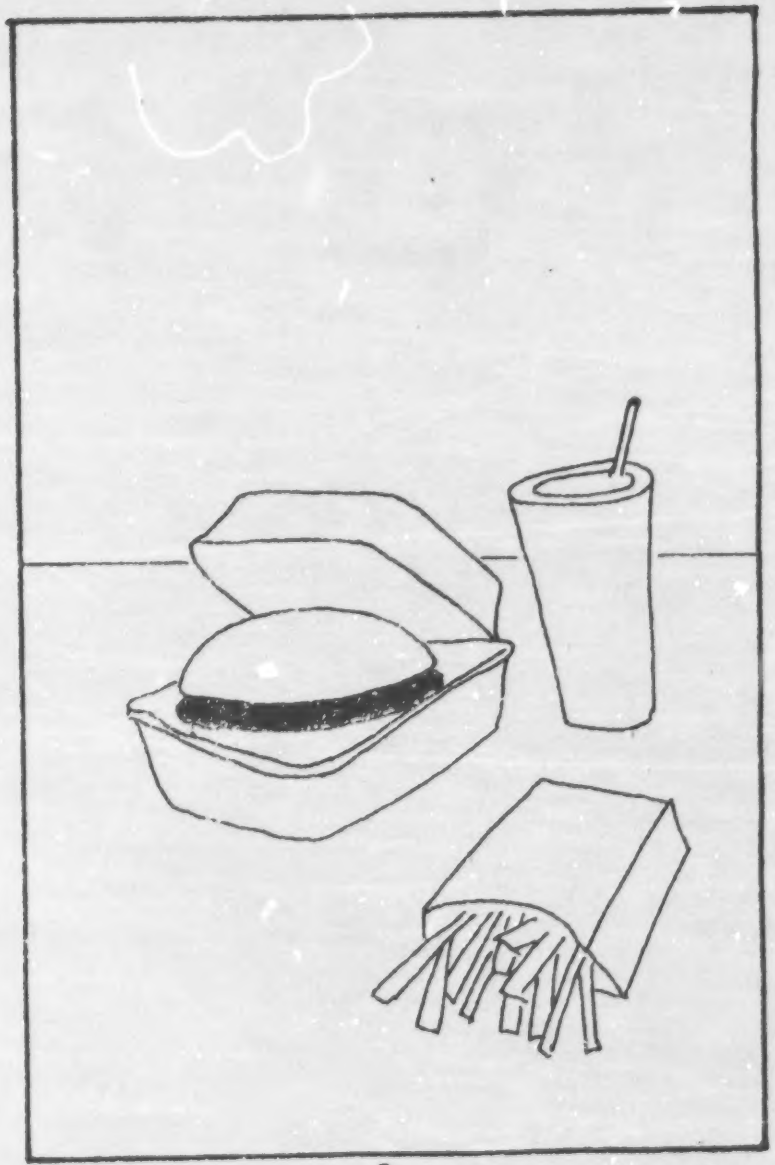
B

A

41

B

42



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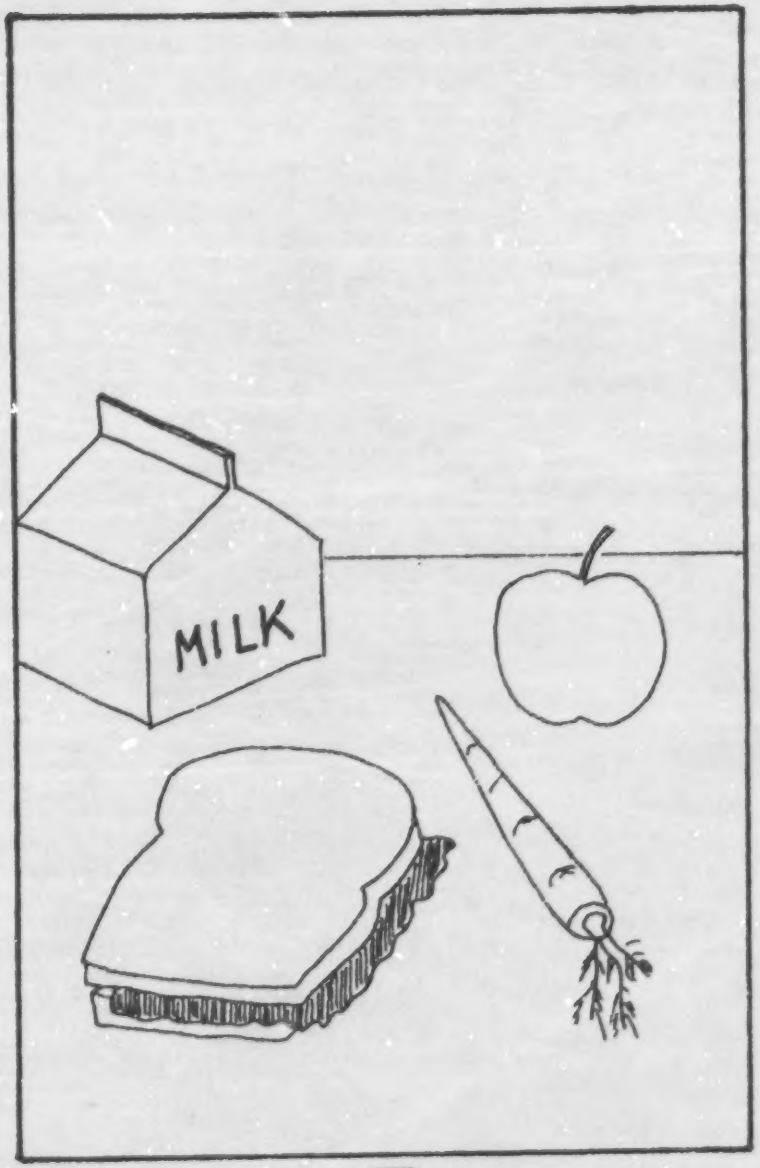

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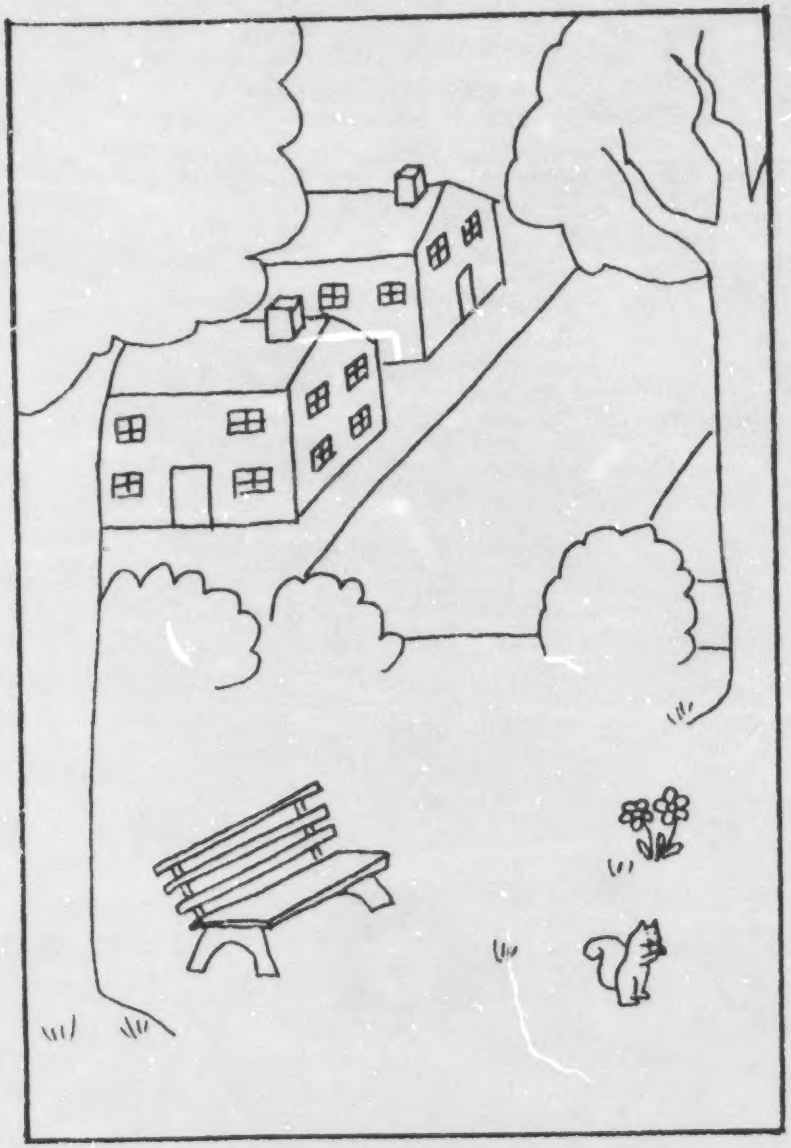

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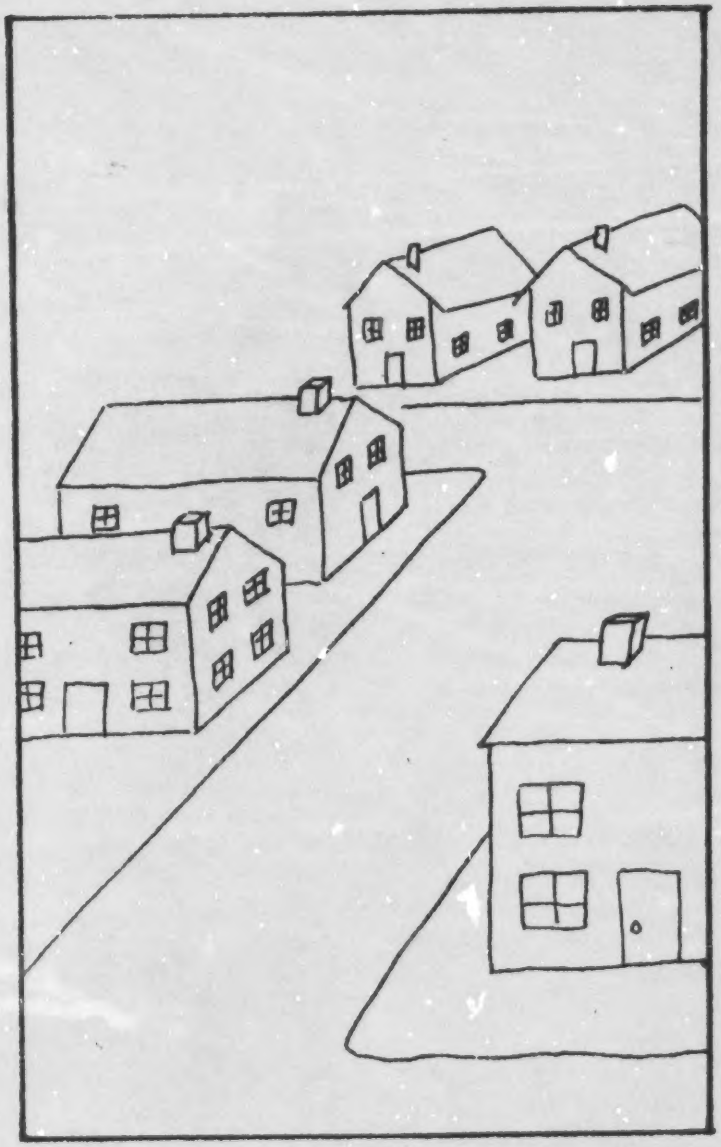

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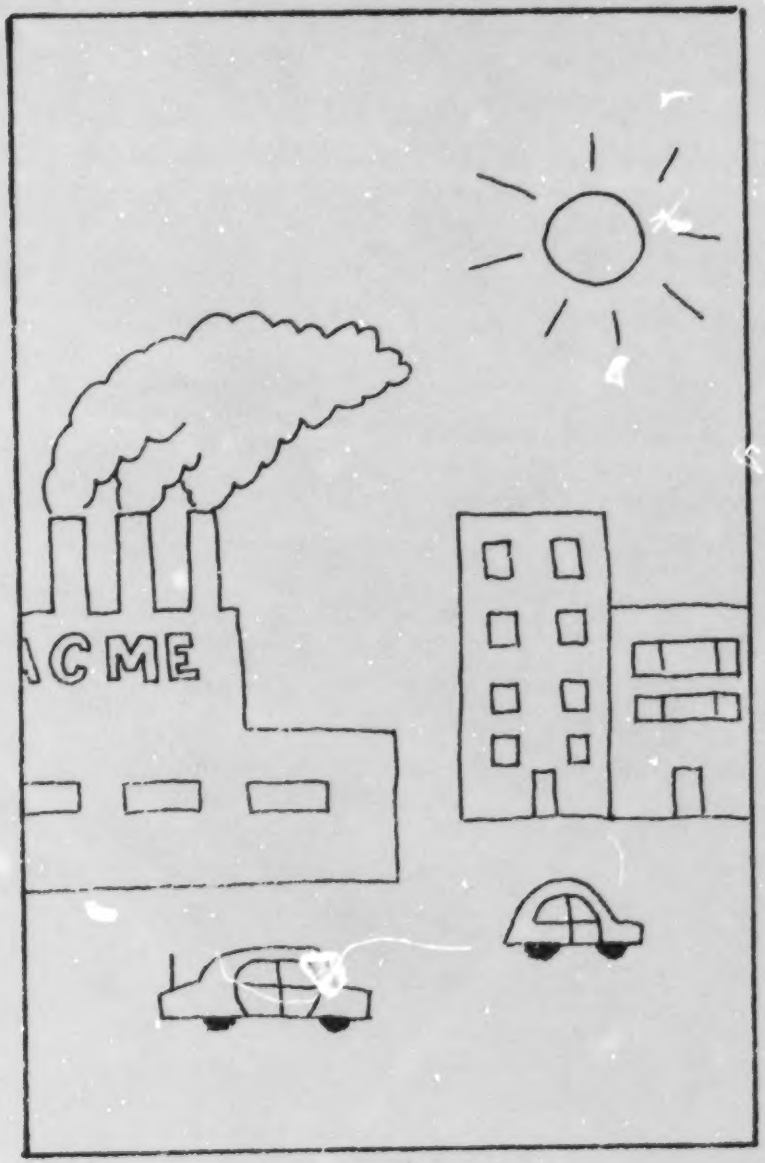

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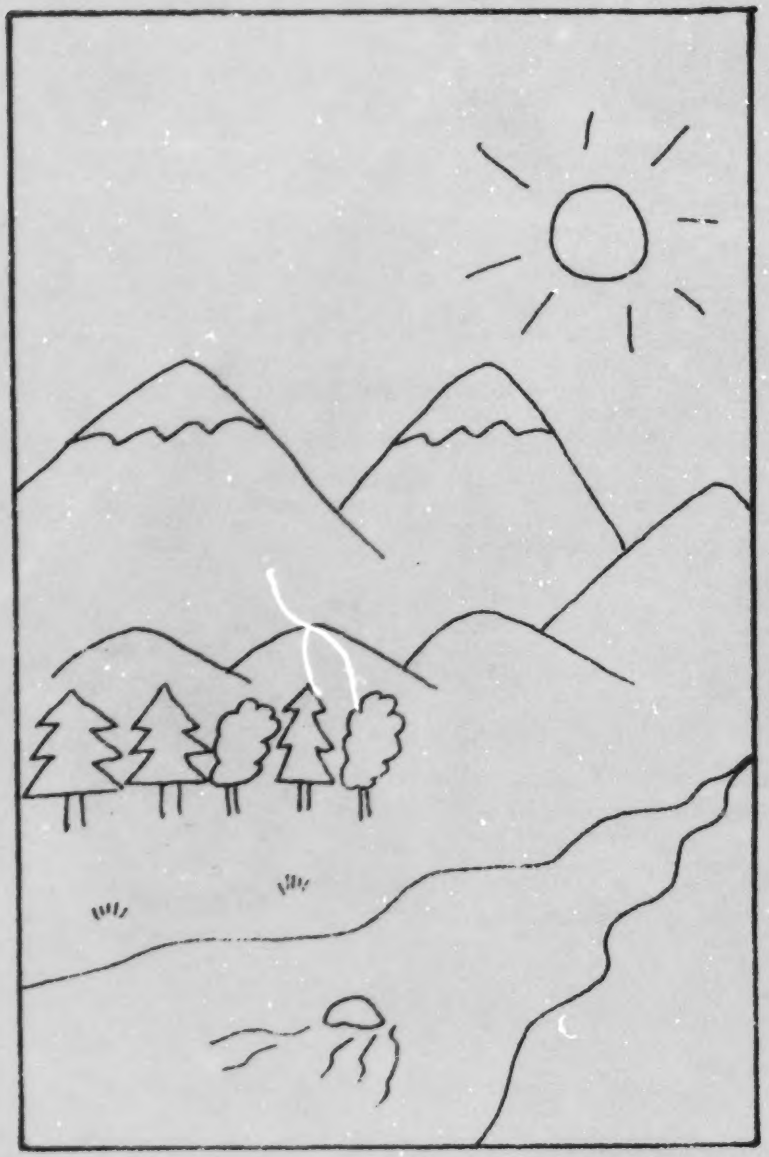

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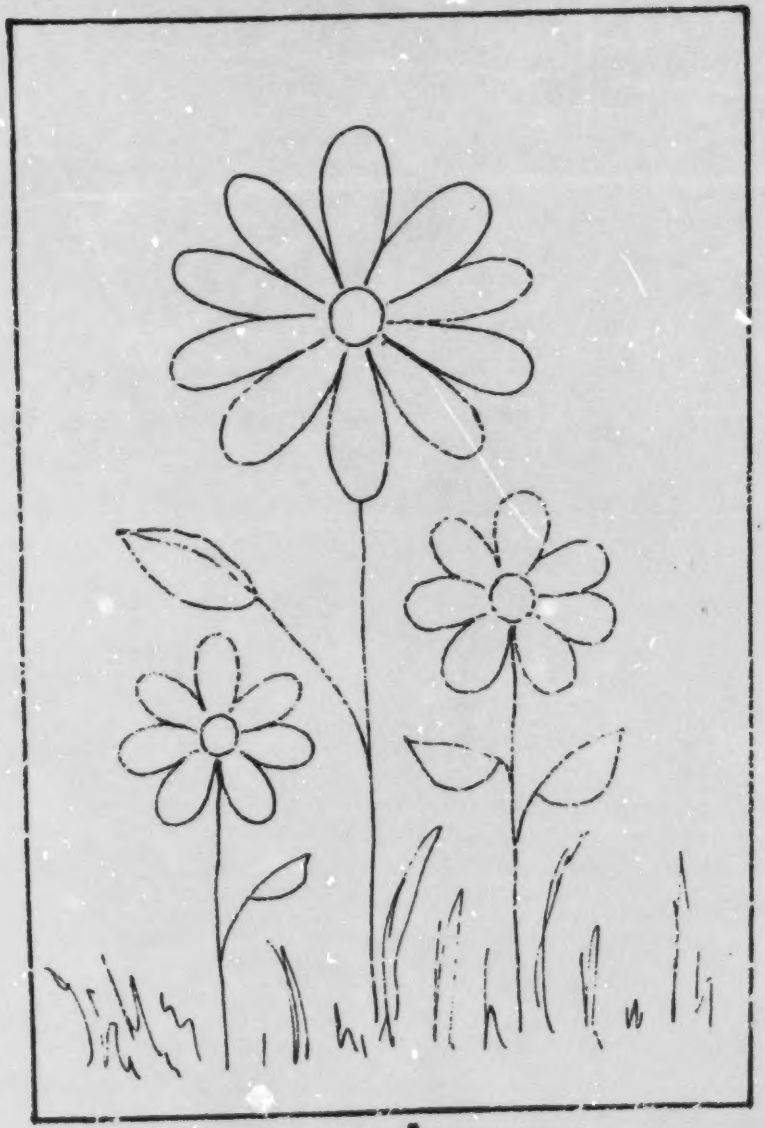

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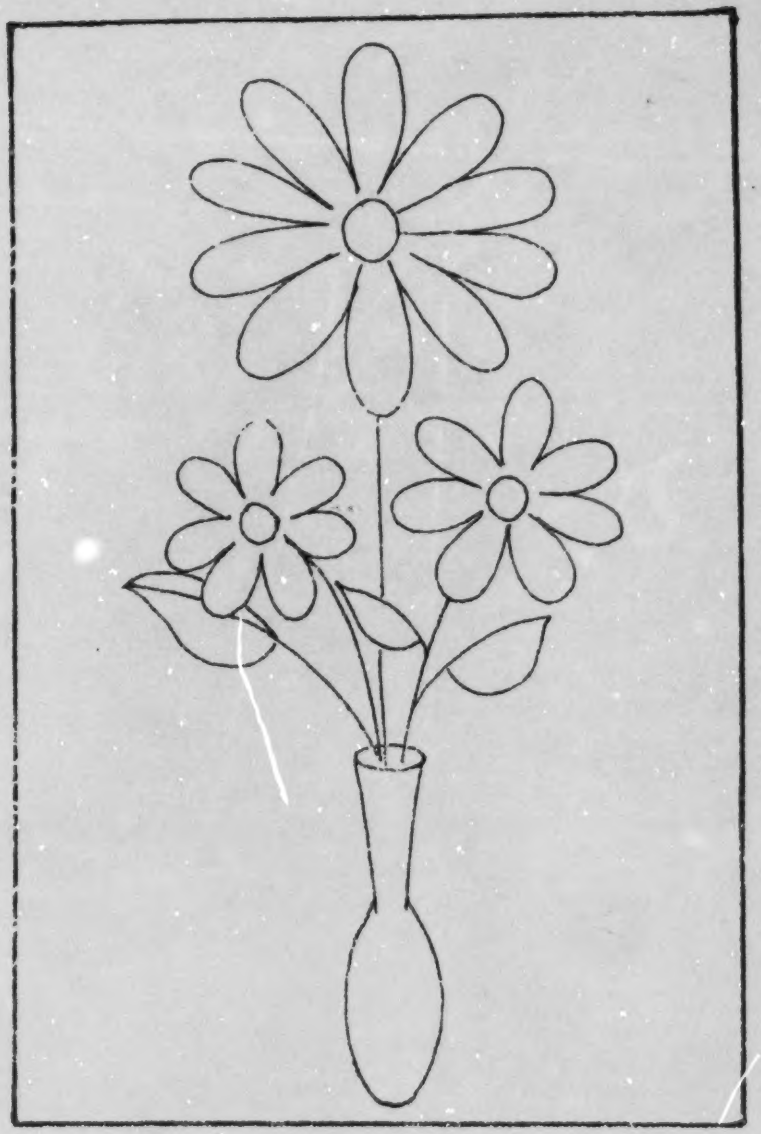


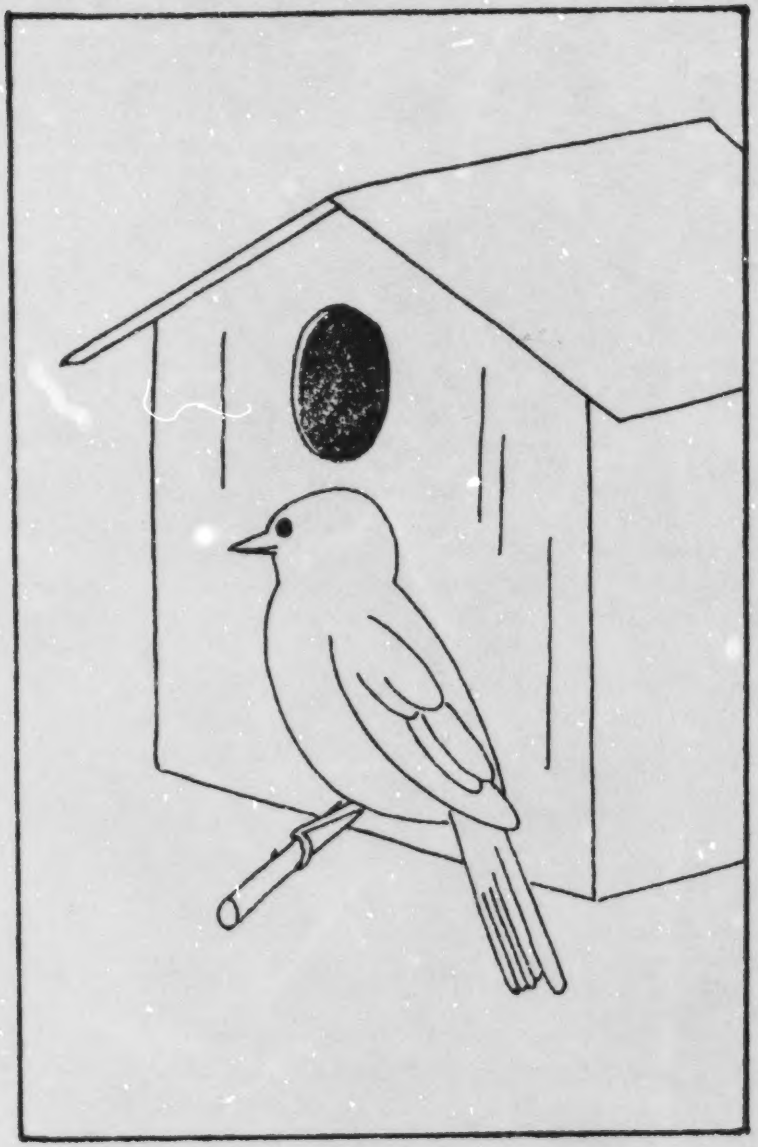
B

A

51

B

52

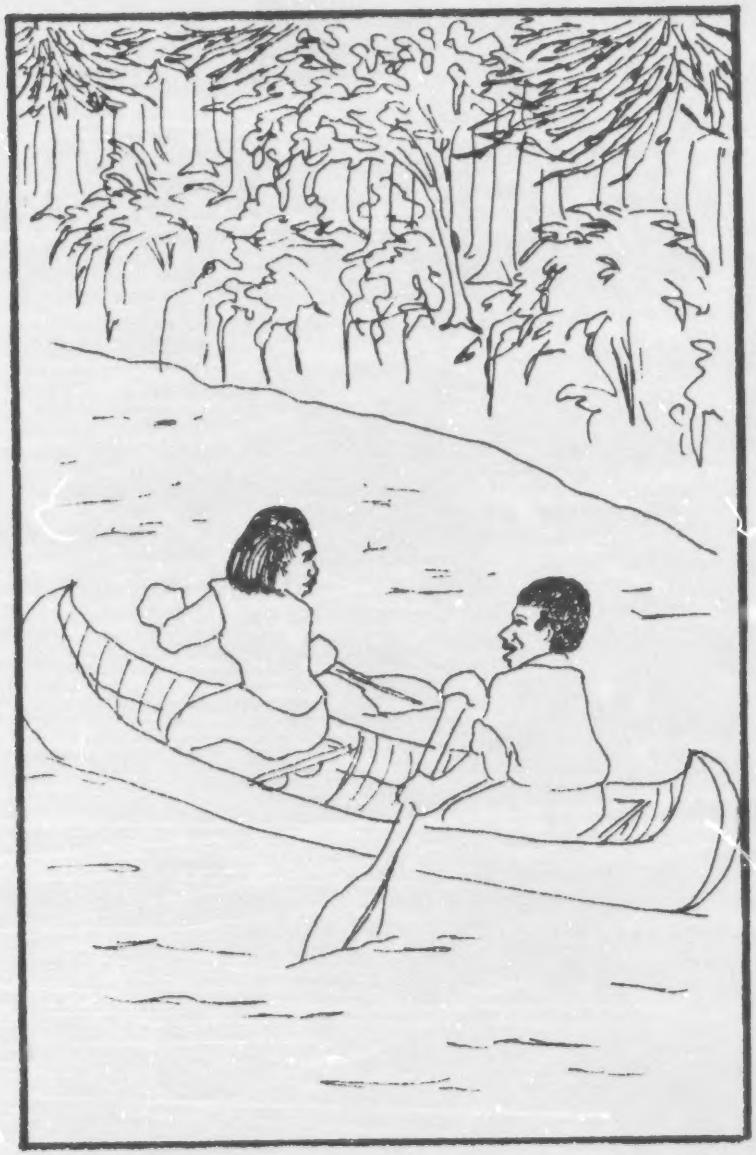


A

53

B

54



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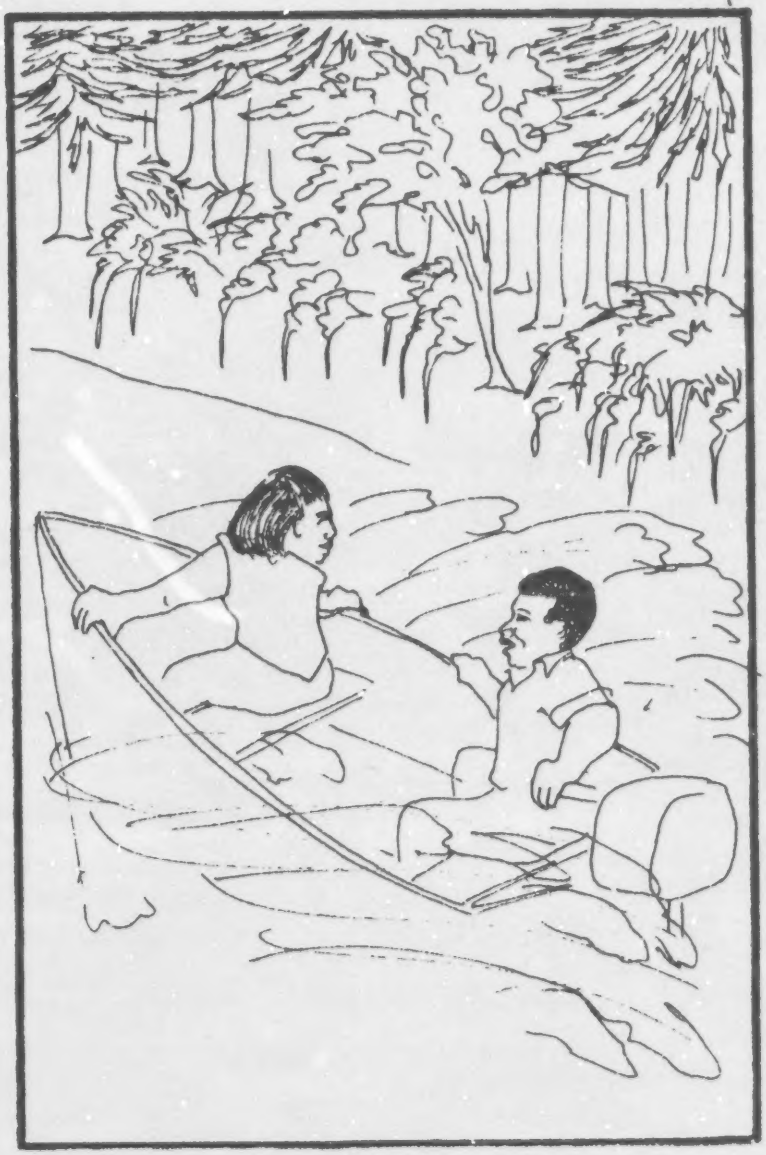
55

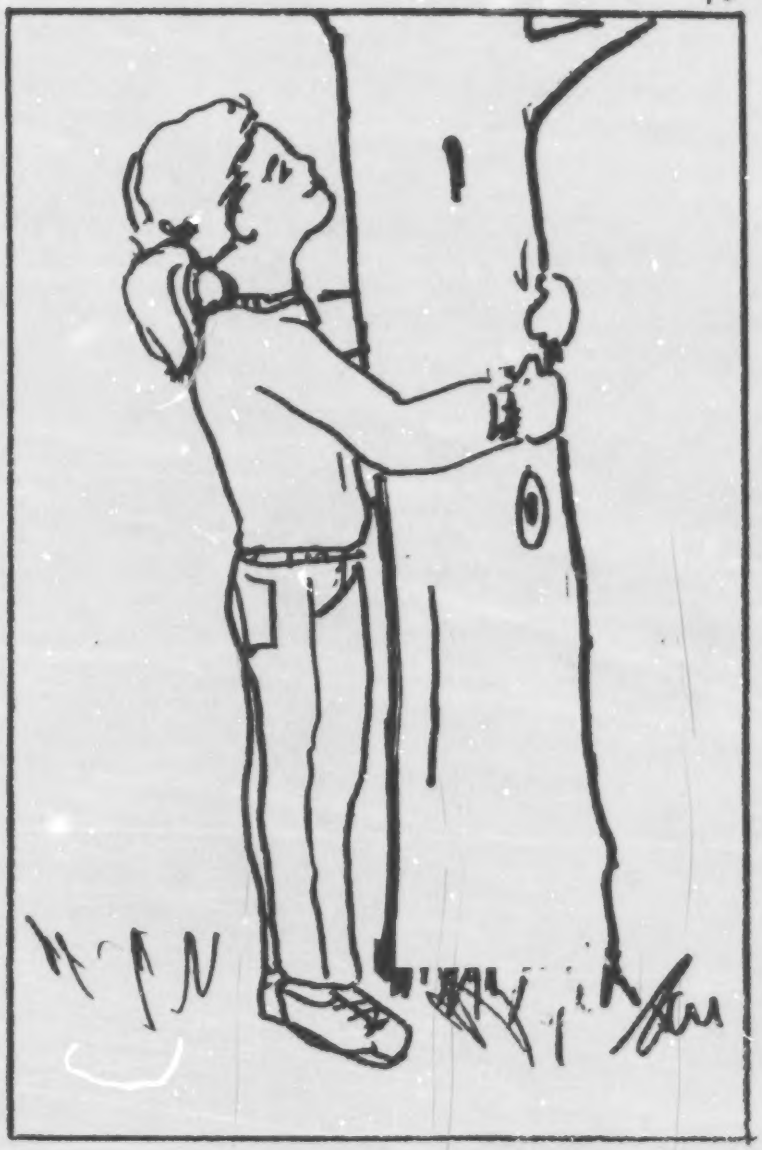


B

56

A

57



B

58

APPENDIX D
Information on the Hidden Villa Program

Frank Juveneck
Francis Duveneck
David Duveneck
Elizabeth Dana
Mary Davey
Stacy French
Helen Fleming
Robert Peckham
Walter Singer
Wallace Stegner
Hope Williams

Executive Directors:
Christy Holloway
Karen Nilsson

HIDDEN VILLA INC., 26870 Moody Rd., Los Altos Hills, California 94022

It does not matter whether one interprets the activities of Hidden Villa Inc. as the supplying of a missing element in American life or as the reinforcement of tendencies once strong but in danger of being obliterated by urbanization and technology.

Either way, Hidden Villa performs an indispensable function. In a time when the health of the earth is too often forgotten or disregarded, it brings to children (and their parents and their teachers) the commitment to earth citizenship and stewardship. In a time of ethnic, cultural, and religious discord it gives children the experience of living and learning together, in equality and harmony, in the company of the good earth. In a time of increasing and dehumanizing urbanization, it makes possible for hundreds of young people each year the experience of putting foot to natural ground, learning and accepting the animals of the wild and the farm, and learning something of the intricate interpendency upon which human life and all other life is built. It restores, for however few and however briefly, a degree of wholeness to the adventure of growing up in America.

Through these experiences, this sharing, this uncovering of the natural world and the revelation of our obligated part in it, Hidden Villa tries to build, sustain, and enhance a vision of the community of life.

Preamble by Wallace Stegner
October 1981

THE MISSION OF HIDDEN VILLA

1. To preserve for the long-term future this unique natural resource so that it may continue to be a meeting place for young and old to connect themselves to a community of caring people and to the cycles of the earth.

2. To preserve Hidden Villa as a natural, historic, educational and recreational resource.

3. To use the natural setting, the farm, and traditions relating to the property to teach humanitarian and environmental values.

4. To enable people to gain an awareness of the inter-relatedness of all living things and renew the mind, body and spirit in a non-urban setting.

5. To preserve and protect the open, natural watershed of Adobe Creek as a comparison to the near-by developed areas.

6. To promote understanding and acceptance of diversity in human and natural communities to underscore the value of the individual.

7. To remain aware of and open to changing human and environmental concerns.

Adopted by the Board of Directors
September, 1981

HIDDEN VILLA GOALS PURPOSE OF HVEP
TOWARDS CHILDREN:
To create a sense of wonderment and sensory exploration

Promote caretaker ethic

Develop ecological understanding

GOALS OF STAFF TRAINING TOWARDS INTERNS AND VOLUNTEERS

To create a sense of caring and community among guides and professional staff.

To promote an attitude of stewardship towards our environment/.

To develop an understanding of how the natural environment is an integral part of our lives.

YTo encourage a closeness to the natural environment in order to expand our perception of what is around us; this promotes values, including lifestayles that seek harmony with nature.

Sample Behavioral Objectives:

1. After the HV experience the child will be able to give a sample food chain.

2, The child will be able to trace a food source at the supermarket back to its origin (DIRT MADE MY LUNCH).

3. Describe why a certain domestic animal is useful.

4. Demonstrate at HV a feeling of responsibility for themself, their group and the environment (E.G. pick up somone else's litter; don't pick pick wildflowers, help someone along the trail in your group, etc.

APPENDIX E
Directory of sample groups

Directory of sample groups

Experimental groups

Walter Hays School, Palo Alto, 855-8403
- Principal: Bill Eliot
- Teacher : Kathy Dilts 26 students
- Pre-test given: Feb 11th
- Classroom visit: Feb 12th
- HV visit: Feb 20th
- Post-test given: Feb 25th

Cherry Chase School, Sunnyvale, (408)736-1153
- Principal: Robert Kessler
- Teachers: Ms. Ranada 33 students
- Ms. Clark 31 students
- Pre-test given: Feb 13th
- Classroom visit: Feb 15th
- HV visit: Feb 26th
- Post-test given: March 4th

A.J.Dorsa School, East San Jose, (408)259-2460
- Teachers: Ms. Itow 30 students
- Ms. Sisney 30 students
- Pre-test given: Feb 18th
- Classroom visit: Feb 20th
- HV visit: Feb 27th
- Post-test given: March 1st

Hoover School, Redwood City, 366-8415
- Principal: Mike Fernandez
- Teachers: Ms. Hodge 29 students
- Ms. Kruse 31 students
- Pre-test given: Feb 21st
- Classroom visit: Feb 22nd
- HV visit: March 1st
- Post-test given: March 5th

Control groups

Taft School, Redwood City, 369-2589
Resource teacher: Bob Mantia
Teacher: Marion Sturgeon 25 students
Pre-test: Feb 21st
Post-test: March 5th

Sloanaker School, East San Jose, (408) 259-1940
Principal: Bob Bird
Teacher: Mary Austin 32 students
Pre-test: Feb 15th
Post-test: March 1st

Escondido School
Teacher: Barbara Richardson 27 students
Pre-test: Feb 26th
Post-test: March 11th

APPENDIX F
Pretest directions (experimental group)

P.O.Box 10515
Stanford CA 94305
19 February 1985

Dear Ms. :

First let me thank you and your class for agreeing to participate in this study. I hope the results can be used to help improve the environmental education curriculum in our schools.

To review our telephone conversation, the purpose of this study is to evaluate whether a field trip to Hidden Villa Ranch has a significant impact on young children's environmental attitudes. With your help, I am asking your students to look at twelve pairs of drawings and to indicate for each pair which drawing they like better. This exercise will be carried out twice : once as a pre-test before the Hidden Villa presentation in the classroom, and once as a post-test after the class visit to the Ranch. Each test should take no more than twenty minutes to administer. Details on the post-test will be given to you on the day of your visit to Hidden Villa. The rest of this letter gives directions for administering the pre-test. Please follow these directions as closely as possible to ensure a high degree of control. However, please feel free to assist students who need help, especially if there are students who do not understand English well.

As we agreed, the pre-test will be adminstered in class before the Hidden Villa staff visit to the class on Feb. 22nd. Enclosed you will find a booklet for each student in your class plus a booklet for yourself. Please do as follows:

1) Introduce the exercise: **"We are now going to do an exercise with pictures."** *("Ahora hacemos un ejercicio con dibujos.")*

2) Pass out the booklets, one per student.

3) Say **"Please follow my directions carefully... Tear off the top sheet of the booklet. This is your answer sheet. Please mark your answers to my questions on this sheet only. Do not write in the booklet."** *(Por favor, escuchen mis intrucciones con cuidado. Quiten la primera página del librete. Esta es tu página de respuestas. Favor de escribir tus respuestas solamente en esta página. No escriban en el librete.")* Please indicate to the students that they may use either the English or Spanish side of the form.

4) Say **"Now please fill in your name and age at the top of the answer sheet, and check off whether you are male or female."** *("Ahora, escriba su nombre y tu edad en la cabeza de la*

página, y marca si eres niño o niña.")

5) Say **"We are going to look at two pictures on each page in the booklet. I want you to choose which picture you like better. Then for each page, I want you to circle your choice on the answer sheet. There are no right answers. Just choose the picture you like better."** *(Vamos a mirar dos dibujos en cada página en el libreto. Vamos a escoger cuál dibujo te gusta más. Entonces para cada página, marca tu selección en tu papel de respuestas. No hay respuestas correctas. Solamente escoge el dibujo que te prefieres más.")*

6) Say **"Now look at the pictures on page one... Which picture do you like better?... Please circle your answer on the answer sheet."** *("Ahora, miren los dibujos en la página uno... Qual dibujo te prefieres más? Favor de marcar tu respuesta en la página de respuestas.")* Please check to see if the students are doing this correctly. When they have done this, tell the students **"Please turn to the next page."** *("Por favor, continuamos a la próxima página.")*

7) If students have difficulty identifying the content of the pictures, use the following descriptions :

Page 1: These are pictures of a boy and a flower.
(Estos dibujos son de un niño y una flor.)

Page 2: These are pictures of a boy and a lizard.
(Estos dibujos son de un niño y un lagarto.)

Page 3: These are pictures of a boy and a spider web.
(Estos dibujos son de un niño y una telaraña.)

Page 4: These are pictures of a family in the country.
(Estos dibujos son de una familia en el campo.)

Page 5: These are pictures of a boy on a walk.
(Estos dibujos son de un niño en camino.)

Page 6: These are pictures of children watching birds.
(Estos dibujos son de algunos niños que observan los pájaros.)

Page 7: These are pictures of children after a picnic.
(Estos dibujos son de algunos niños despúes de un picnic.)

Page 8: These are pictures of lunches.
(Estos dibujos son de algunos almuerzos.)

Page 9: These are pictures of neighborhoods.
(Estos dibujos son de algunas vecinidades.)

Page 10: These are pictures of a town and of the country.
(Estos dibujos son de un pueblo y el campo.)

Page 11: These are pictures of flowers.
(Estos dibujos son de unos flores.)
Page 12: These are pictures of deer.
(Estos dibujos son de un venado.)

8) Say **"This should be page two"** *("Esto debe ser la página dos.")*. If students have trouble finding it, please help them out. When all the students are on page two, tell them **"Look at the pictures on page two."** *("Vamos a observar los dibujos en la página dos.")* Go back to #6 and continue administering the test in the same manner, using the appropriate page numbers (and the appropriate descriptions if necessary).

9) After page 12, collect the answer sheets separately from the booklets. Do not discuss the answers or the test since there will be a post-test using the same drawings.

10) Please note on a piece of paper if there were any problems in administering this test, whether in the directions, in the content of specific drawings or in any other aspect of this exercise.

11) Have the booklets and the answer sheets ready for pick-up in the main office.

If any of the directions are unclear, please feel free to contact me (or leave a message) at (415)853-9674 (afternoons, early evenings are best).

Once again, thank you very much for your cooperation. I will be in touch about the post-test. I look forward to receiving these pre-tests.

Sincerely,

APPENDIX G
Posttest directions (experimental group)
Answer forms (front and back)

P.O.Box 10515
Stanford CA 94305
28 February 1985

Dear Ms. :

I hope you and your class enjoyed your visit to Hidden Villa. This letter gives directions for administering the post-test. If at all possible, it should be given two school days after your visit to Hidden Villa (around March 5th). The test is exactly the same as the pre-test except that the order is reversed and three additional pages have been added. It should take approximately the same amount of time to administer. Again, please follow these directions as closely as possible to ensure a high degree of control. However, please feel free to assist students who need help, especially if there are students who do not understand English well.

Enclosed you will find a booklet for each student in your class plus a booklet for yourself. Please do as follows:

1) Introduce the exercise: **"We are now going to do an exercise with pictures."** *("Ahora hacemos un ejercicio con dibujos.")*

2) Pass out the booklets, one per student.

3) Say **"Please follow my directions carefully... Tear off the top sheet of the booklet. This is your answer sheet. Please mark your answers to my questions on this sheet only. Do not write in the booklet."** *(Por favor, escuchen mis intrucciones con cuidado. Quiten la primera página del librete. Esto es tu página de respuestas. Favor de escribir tus respuestas solamente en esta página. No escriban en el librete.")* Please indicate to the students that they may use either the English or Spanish side of the form.

4) Say **"Now please fill in your name and age at the top of the answer sheet, and check off whether you are male or female."** *("Ahora, escriba tu nombre y tu edad en la cabeza de la página, y marca si eres niño o niña.")*

5) Say **"We are going to look at two pictures on each page in the booklet. I want you to choose which picture you like better. Then for each page, I want you to circle your choice on the answer sheet. There are no right answers. Just choose the picture you like better."** *(Vamos a mirar dos dibujos en cada página en el librete. Vamos a escoger cuál dibujo te gusta más. Entonces para cada página, marca tu selección en tu papel de respuestas. No hay respuestas correctas. Solamente escoge el dibujo que te prefieres más.")*

6) Say **"Now look at the pictures on page one... Which picture do you like better?... Please circle your answer on the answer sheet."** *("Ahora, miren los dibujos en la página una... Qual dibujo te prefieres más? Favor de marcar tu respuesta en la página de respuestas.")* Please check to see if the students are doing this correctly. When they have done this, tell the students **"Please turn to the next page."** *("Por favor, continuamos a la próxima página.")*

7) If students have difficulty identifying the content of the pictures, use the following descriptions :

Page 1: These are pictures of deer.
(Estos dibujos son de un venado.)

Page 2: These are pictures of flowers.
(Estos dibujos son de unos flores.)

Page 3: These are pictures of a town and of the country.
(Estos dibujos son de un pueblo y el campo.)

Page 4: These are pictures of neighborhoods.
(Estos dibujos son de algunos vecinidades.)

Page 5: These are pictures of lunches.
(Estos dibujos son de algunos almuerzos.)

Page 6: These are pictures of children after a picnic.
(Estos dibujos son de algunos niños despùes de un picnic.)

Page 7: These are pictures of children watching birds.
(Estos dibujos son de algunos niños que observan los pájaros.)

Page 8: These are pictures of a boy on a walk.
(Estos dibujos son de un niño en camino.)

Page 9: These are pictures of a family in the country.
(Estos dibujos son de una familia en el campo.)

Page 10: These are pictures of a boy and a spider web.
(Estos dibujos son de un niño y una telaraña.)

Page 11: These are pictures of a boy and a lizard.
(Estos dibujos son de un niño y un lagarto.)

Page 12: These are pictures of a boy and a flower.
(Estos dibujos son de un niño y una flor.)

Page 13: These are pictures of a bird.
(Estos dibujos son de un pájaro.)

Page 14: These are pictures of two people in a boat.
(Estos dibujos son de dos personas en un bote.)

Page 15: These are pictures of a girl and a tree.
(Estos dibujos son de una niña y un árbol.)

8) Say **"This should be page two"** *("Esto debe ser la página dos.")*. If students have trouble finding it, please help them out. When all the students are on page two, tell them **"Look at the pictures on page two."** *("Vamos a observar los dibujos en la página dos.")* Go back to #6 and continue administering the test in the same manner, using the appropriate page numbers (and the appropriate descriptions if necessary).

9) After page 15, collect the answer sheets separately from the booklets.

10) Pass out the parent questionnaires to the students. Tell the students **"Please take these forms home to your parents. They are to complete them for you to return to school in two days."** *("Por favor, llevan estes papeles a sus casas y los dan a sus padres. Entonces, les piden para completarlos en dos dias para que ustedes pueden devolverlos a la clase.")* Enclosed please find stickers to be given to the students when they return the questionnaire from home.

11) Please fill out the teacher questrionnaire.

12) Have the booklets, the answer sheets, the parent questionnaires and the teacher questionnaire ready for pick-up in the main office three days after the post-test is given (around March 8th).

If any of the directions are unclear, please feel free to contact me (or leave a message) at (415)853-9674 (afternoons, early evenings are best).

Once again, thank you very much for your cooperation.

Sincerely,

PICTURE EXERCISE

Name _____

Age_____

(check one) Male____Female_____

Please circle your answer.

On page 1:	I like Picture A better	I like Picture B better
On page 2:	I like Picture A better	I like Picture B better
On page 3:	I like Picture A better	I like Picture B better
On page 4:	I like Picture A better	I like Picture B better
On page 5:	I like Picture A better	I like Picture B better
On page 6:	I like Picture A better	I like Picture B better
On page 7:	I like Picture A better	I like Picture B better
On page 8:	I like Picture A better	I like Picture B better
On page 9:	I like Picture A better	I like Picture B better
On page 10:	I like Picture A better	I like Picture B better
On page 11:	I like Picture A better	I like Picture B better
On page 12:	I like Picture A better	I like Picture B better
On page 13:	I like Picture A better	I like Picture B better
On page 14:	I like Picture A better	I like Picture B better
On page 15:	I like Picture A better	I like Picture B better

EJERCICIO DE DIBUJO

Me llamo _____

Tengo _____ años.

Soy niño niña (Favor de circular)

Favor de circular tu respuesta.

En la página 1: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 2: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 3: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 4: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 5: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 6: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 7: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 8: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 9: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 10: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 11: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 12: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 13: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 14: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

En la página 15: Me gusta el dibujo A mejor. Me gusta el dibujo B mejor.

APPENDIX H
Parent Questionnaire (front and back)

Dear parent or guardian:

Your child recently participated in the Hidden Villa Environmental Program on a class field trip. We hope he or she enjoyed the visit to our ranch. In order for Hidden Villa to serve future classes better, we would like you to answer these questions and to add your comments. This questionnaire may be completed by either parent or a guardian. Please return this questionnaire to your child's teacher in the next two days. Thank you for your cooperation.

Your name_____

Child's name_____

Do you have any other children? If yes, what are their ages?_____

_____

What is the highest level of formal schooling you have completed? (Please circle one).

Elementary 1 2 3 4 5 6 7 8
High School 9 10 11 12
College 1 2 3 4
Postgraduate 1 2 3 4 5

Have you taken your child(ren) on any outdoors or environmental experiences, such as camping, hiking or a visit to a natural history museum?

What, if any, differences have you noticed in your child after his or her visit to Hidden Villa (for example, more discussion about the environment or greater tendency to pick up trash)?

Additional comments: Please use separate sheet of paper and attach.

Estimados Padres o Custodio:

Su hijo o hija recientemente participó en el Hidden Villa Environmental Program en un viaje que hizo su clase escolar. Esperamos que le gustó la visita a nuestro rancho. De manera que Hidden Villa pueda servir otras clases escolares mejor, le pedimos que contesten estas preguntas y que agregen sus comentarios. Este cuestionario puede ser completado por uno de los dos padres o por el custodio. Favor de devulver este cuestionario al maestro de su hijo dentro de los dos pròximos dias. Gracias por su cooperación.

Su nombre _____

El nombre de su hijo _____

¿Tiene Ud. otros hijos? ¿Si contestó sí, cuales son sus edades?

_____

¿Cuál es el nivel de escolanza màs alta que Ud. ha completado? (Favor de circular uno)

Elementario 1 2 3 4 5 6 7 8
Segundaria 9 10 11 12
Universitaria 1 2 3 4
Post Graduado 1 2 3 4 5

¿Ha elevado Ud. a sus hijos en algun viaje de naturaleza tales como camping, caminatas o una visita a un museo de historia natural?

¿Que diferencias, si algunas, ha notado Ud. despues que su hijo o hija visitó Hidden Villa (por ejemplo, su hijo o hija ha tenido más conversasiones sobre la naturaleza o más tendencias hacia a necojer basura)?

Comentarios adicionales: Favor de usar una hoja de papel separada y tachar a esta hoja.

APPENDIX I
Teacher Questionnaire

Teacher Questionnaire

Please answer these questions in order to improve analysis of the student test results. Thanks for your cooperation.

School:_____
Teacher:_____
Number of students:_____
Date pre-test given:_____
Date post-test given:_____
Has the class been to Hidden Villa before? Yes_____No_____
Was there any difficulty in administering the pre-test? the post-test?

What, if any, noticeable differences are there in the students as a result of their visit to Hidden Villa (for example, more discussion about the outdoors or the environment, less packaging in lunches, greater tendency to pick up trash)?

Was there any instruction in environmental education before the testing period? during the testing period? If yes, what topics were taught?

Compared to previous classes, would you characterize this class as more, less or equally aware of environmental issues?

APPENDIX J
$SPSS_x$ program

```
R 85    SPSS-A RELEASE 1.0 FOR DEC-20    MAY 21,1984
COMPUTER FACILITY          DEC - 2060

     SPSS INC LICENSE NUMBER:   1224

0          TITLE JACA'S A.M. PROJECT
0          FILE HANDLE AM,DAT/NAME='JACOB.TXT'
0          COMMENT *** DEVELOPMENT OF EVALUATION INSTRUMENT FOR YOUNG CHILDREN'S
0               ENVIRONMENTAL ATTITUDES    DATA DEFINITION BEGINS HERE
0          DATA LIST FILE=AM.DAT/STUD# 1-3 AGE GENDER SEQUENCE PRE1 PRE2 PRE3 PRE4
0               PRE5 PRE6 PRE7 PRE8 PRE9 PRE10 PRE11 PRE12 POST12 POST11 POST10
0               POST9 POST8 POST7 POST6 POST5 POST4 POST3 POST2 POST1 POST13
0               POST14 POST15 SIBS SCHOOL OUTEXP HMBEH HVB4 SCBEH EE ECOL 4-41

ABOVE DATA LIST STATEMENT WILL READ   1 RECORDS FROM FILE AM.DAT  .

     VARIABLE  REC    START     END          FORMAT  WIDTH  DEC

     STUD#       1        1       3          F           3    0
     AGE         1        4       4          F           1    0
     GENDER      1        5       5          F           1    0
     SEQUENCE    1        6       6          F           1    0
     PRE1        1        7       7          F           1    0
     PRE2        1        8       8          F           1    0
     PRE3        1        9       9          F           1    0
     PRE4        1       10      10          F           1    0
     PRE5        1       11      11          F           1    0
     PRE6        1       12      12          F           1    0
     PRE7        1       13      13          F           1    0
     PRE8        1       14      14          F           1    0
     PRE9        1       15      15          F           1    0
     PRE10       1       16      16          F           1    0
     PRE11       1       17      17          F           1    0
     PRE12       1       18      18          F           1    0
     POST12      1       19      19          F           1    0
     POST11      1       20      20          F           1    0
     POST10      1       21      21          F           1    0
     POST9       1       22      22          F           1    0
     POST8       1       23      23          F           1    0
     POST7       1       24      24          F           1    0
     POST6       1       25      25          F           1    0
     POST5       1       26      26          F           1    0
     POST4       1       27      27          F           1    0
     POST3       1       28      28          F           1    0
     POST2       1       29      29          F           1    0
     POST1       1       30      30          F           1    0
     POST13      1       31      31          F           1    0
     POST14      1       32      32          F           1    0
     POST15      1       33      33          F           1    0
     SIBS        1       34      34          F           1    0
     SCHOOL      1       35      35          F           1    0
     OUTEXP      1       36      36          F           1    0
     HMBEH       1       37      37          F           1    0
     HVB4        1       38      38          F           1    0
     SCBEH       1       39      39          F           1    0
     EE          1       40      40          F           1    0
     ECOL        1       41      41          F           1    0
```

```
  JACK'S A.M. PROJECT
TER FACILITY          DEC - 2060

AL   TABLE.

      VARIABLE LABELS
            STUD#     'STUDENT IDENTIFICATION NUMBER'
            AGE       'AGE OF STUDENT'
            GENDER              'GENDER OF STUDENT'
            SEQUENCE  'SEQUENCE TESTS GIVEN'
            PRE1      'PRETEST QUESTION 1'
            PRE2      'PRETEST QUESTION 2'
            PRE3      'PRETEST QUESTION 3'
            PRE4      'PRETEST QUESTION 4'
            PRE5      'PRETEST QUESTION 5'
            PRE6      'PRETEST QUESTION 6'
            PRE7      'PRETEST QUESTION 7'
            PRE8      'PRETEST QUESTION 8'
            PRE9      'PRETEST QUESTION 9'
            PRE10     'PRETEST QUESTION 10'
            PRE11     'PRETEST QUESTION 11'
            PRE12     'PRETEST QUESTION 12'
            POST11              'POSTTEST QUESTION 11'
            POST12              'POSTTEST QUESTION 12'
            POST10              'POSTTEST QUESTION 10'
            POST9     'POSTTEST QUESTION 9'
            POST8     'POSTTEST QUESTION 8'
            POST7     'POSTTEST QUESTION 7'
            POST6     'POSTTEST QUESTION 6'
            POST5     'POSTTEST QUESTION 5'
            POST4     'POSTTEST QUESTION 4'
            POST3     'POSTTEST QUESTION 3'
            POST2     'POSTTEST QUESTION 2'
            POST1     'POSTTEST QUESTION 1'
            POST13              'POSTTEST QUESTION 13'
            POST14              'POSTTEST QUESTION 14'
            POST15              'POSTTEST QUESTION 15'
            INCO      'INCOME'
            EDUCDAD             'EDUCATION OF PARENT'
            OUTEXP              'OUTDOORS EXPERIENCE'
            BEHAVH    'BEHAVIOR AT HOME AFTER MV VISIT'
            MVBEF     'VISIT TO MV BEFORE'
            BEHAVS    'BEHAVIOR AT SCHOOL AFTER MV VISIT'
            EE        'ENVIRONMENTAL ED AT SCHOOL'
            ECOL      'RELATIVE ECOLOGICAL AWARENESS OF CLASS'
      VALUE LABELS
            GENDER              1 'MALE' 2 'FEMALE'/
            SEQUENCE  1 'A TO B' 2 'B TO A'/
            AGES      0 'NONE' 1 'OLDER' 2 'YOUNGER' 3 'BOTH' 9 'MISSING'/
            SCHOOL              1 'ELEMENTARY' 2 'SECONDARY' 3 'COLLEGE'
                        4 'POSTGRAD' 9 'MISSING'/
            OUTEXP              0 'NONE' 1 'YES' 9 'MISSING'/
            BEHAVH    0 'NO DIFFERENCE' 1 'DIFFERENCE' 9 'MISSING'/
            MVBEF     0 'NO' 1 'YES' 9 'MISSING'/
            BEHAVS    0 'NO DIFFERENCE' 1 'DIFFERENCE' 9 'MISSING'/
```

```
;5   JACK'S A.M. PROJECT
MPUTER FACILITY              DEC - 2060

                EE        0 'NO' 1 'YES BEFORE TESTS' 2 'YES DURING TESTS'
                          9 'MISSING'/
                ECOL      0 'NO DIFFERENCE' 1 'BETTER' 2 'WORSE' 9 'MISSING'/
          MISSING VALUES PRE1 TO ECOL (8,9)
          COMPUTE TOTCH = (POST1+POST2+POST3+POST4+POST5+POST6+POST7+POST8+POST9
          +POST10+POST11+POST12)*100-(PRE1+PRE2+PRE3+PRE4+PRE5+PRE6+PRE7
          +PRE8+PRE9+PRE10+PRE11+PRE12)
          MISSING VALUES TOTCH (0)
          RECODE STUD* (0 THRU 699=1) (700 THRU 999=2)
          VARIABLE LABELS STUD* 'SAMPLE'
          VALUE LABELS STUD* 1 'EXPTAL' 2 'CONTROL'
          CROSSTABS VARIABLES = AGE(0,9) STUD*(1,2)/
                TABLES=AGE BY STUD*
          STATISTICS ALL

 CROSSTABS NEED       100 WORDS OF MEMORY.

RE    111144 WORDS OF MEMORY AVAILABLE.
EST CONTIGUOUS AREA WAS    111144 WORDS.
```

APPENDIX K

Complete breakdown of total change scores

Complete Breakdown of Total Change Scores

Total Change	Experimental	Control
-4	2 (1%)	1 (1%)
-3	6 (4%)	2 (3%)
-2	3 (2%)	4 (6%)
-1	18 (11%)	14 (20%)
0	32 (20%)	20 (29%)
+1	33 (20%)	8 (11%)
+2	29 (18%)	10 (14%)
+3	17 (10%)	8 (11%)
+4	16 (10%)	2 (3%)
+5	5 (3%)	0
+6	0	1 (1%)
+7	1 (1%)	0
	162	70